



CPS: Synergy: Enabling Smart Underground Mining with an Integrated Context-aware Wireless Cyber-Physical Framework (Award ID: 1646576)

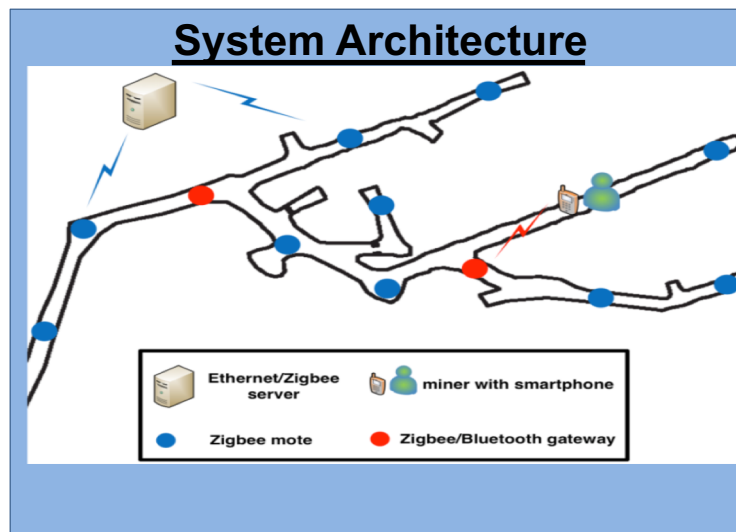
Qi Han (qhan@mines.edu), Department of Computer Science, Colorado School of Mines

Challenges:

- High cost of deploying safety infrastructure in underground mines encourages companies today to meet only the bare minimum required safeguards
- How to overcome monitoring, communication, and tracking challenges in the underground mines to realize a cost-effective safety infrastructure

Scientific Impact:

- Foundational research outcomes are applicable to a wide range of applications in the realms of S&CC and IoT



Solution:

devise, design, prototype, and test a fundamentally novel wireless cyber-physical framework of low-cost, energy-efficient, and reliable sensor nodes and commodity smartphones for monitoring, tracking, and communication, to improve miner safety in underground mines.

Broader Impact:

- The developed framework will minimize the risks facing hundreds of thousands of miners in the USA

Recent Progress Highlights

- Studied packet delivery performance of WiFi in underground environments and compared that with its performance in a regular building
- Developed a hidden Markov-model based framework that enables efficient porting of indoor localization techniques across mobile devices to maximize accuracy